

REMARKS

Claims 1-48, all the claims pending in the application, stand rejected on prior art grounds. Applicants respectfully traverse these rejections based on the following discussion.

I. The Prior Art Rejections

Claims 1-20 stand rejected under 35 U.S.C. §102(e) as being anticipated by Lin (U.S. Publication No. 2005/0250019) or Udagawa, et al. (U.S. Publication No. 2004/0126673), hereinafter referred to as Udagawa. Claims 1-48 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Lin or Udagawa, in view of Cardinale (U.S. Patent No. 6,368,942). Applicants respectfully traverse these rejections based on the following discussion.

The Applicants' claimed invention, as provided in independent claims 1, 8, 18, 27, and 43 contain features, which are patentably distinguishable from the prior art references of record. Lin teaches a mask device includes a single layer of reflection mask on a transparent substrate to simply the growth fabricating of the reflection mask, therefore, using single layer of reflection mask can easier control the defect. Furthermore, a pattern-transferring method for a photolithography process is to utilize the incident exposing radiation with a grazing incident angle to illuminate the photolithography mask, such that the pattern can be transferred onto the wafer clearly, and the resolution of the photolithography would be improved.

Lin specifically describes the entire mask, and describing the conventional Mo/Si multilayer and 5 degree exposure angle. The Applicants' invention work with these constants of stepper conditions and mask blank and move forward from there. This is one of the profound differences in Lin and the Applicants' claimed invention. Specifically, Lin teaches a transparent

substrate. Conversely, the Applicants' claimed invention is not so limiting. Lin also repeatedly teaches, to provide a single-layer solution different from the current multilayer approach. This layer is supposed to have a reflectivity higher than the conventional approach. The Applicants' do not claim either. Lin teaches a grazing angle of incidence, quite different from the near normal exposure that is used on all conventional EUVL configurations. The grazing angle would also introduce some issues with the edge fidelity of images as the light will be partially reflected and partially scattered over a larger area. In general, Lin teaches against the Applicants' claimed invention.

Udagawa teaches microlithography reticles are disclosed that include a high-contrast reticle-identification code (bar code). The bar code is configured as a pattern (usually linearly arrayed) of high-scattering regions (bar-code elements) each exhibiting a relatively high degree of reflection-scattering of irradiated probe light. The high-scattering regions are separated from one another by respective low-scattering regions each exhibiting a relatively low degree of reflection-scattering of incident probe light. For example, the low-scattering regions have smooth surfaces from which very little probe light is reflection-scattered, wherein each high-scattering region includes multiple scattering features such as line, channels, projections, or the like that provide multiple edges and/or points that reflection-scatter probe light. The edges in a high-scattering region can be arranged with a line-space (L/S) pitch that is below the resolution limit of an optical system that delivers probe light to the bar code and detects probe light reflection-scattered from the bar code.

More specifically, Udagawa teaches barcodes - large feature items on the photomask. The "scattering" features are typically reflective and the "low scattering" features are typically

transparent quartz. Udagawa attempts to improve the readability of the bar code on masks that are designed for electron exposure and therefore do not have conventionally transparent regions. The bar code is read by an optical beam (not imaged at all). Moreover, Udagawa specifically teaches the reticle identification code. However, there is no teaching in Udagawa to use a scattering technique for the entire mask. Additionally, the design creates multiple peaks under illumination - a condition to be avoided with real mask features.

Cardinale teaches a method for fabricating masks for extreme ultraviolet lithography (EUVL) using Ultra-Low Expansion (ULE) substrates and crystalline silicon. ULE substrates are required for the necessary thermal management in EUVL mask blanks, and defect detection and classification have been obtained using crystalline silicon substrate materials. Thus, this method provides the advantages for both the ULE substrate and the crystalline silicon in an Extreme Ultra-Violet (EUV) mask blank. The method is carried out by bonding a crystalline silicon wafer or member to a ULE wafer or substrate and thinning the silicon to produce a 5-10 μm thick crystalline silicon layer on the surface of the ULE substrate. The thinning of the crystalline silicon may be carried out, for example, by chemical mechanical polishing and if necessary or desired, oxidizing the silicon followed by etching to the desired thickness of the silicon. Cardinale focuses on the introduction of a crystalline silicon layer into the EUV mask blank. There is no discussion in Cardinale of the patterning of the subsequent mask.

The above notwithstanding, the Lin reference and Udagawa reference are each individually relied upon as teaching the entirety of claims 1-20. Moreover, a combination of Lin with Cardinale and Udagawa with Cardinale are relied upon as teaching the entirety of claims 1-48. Submitted herewith is a Rule 131 Declaration swearing behind each of the Lin and Udagawa

references. The Rule 131 Declaration removes both the Lin and Udagawa references (and any reference having a priority date of May 25, 2003 or later).

The Rule 131 Declaration effectively swears behind the Lin reference based on the evidence presented in the Rule 131 Declaration and because the earliest priority date of Lin is May 4, 2004, which according to MPEP §715(I) and MPEP §715(III), is the effective date of Lin. The accompanying Rule 131 Declaration makes clear that the Applicants' claimed invention was conceived and reduced to practice at least prior to May 4, 2004. Thus, the Rule 131 Declaration effectively swears behind Lin.

The Rule 131 Declaration effectively swears behind the Udagawa reference based on the evidence presented in the Rule 131 Declaration and because the effective date of Udagawa for the purposes of a rejection under 35 U.S.C. §102(e) is the U.S. filing date (August 29, 2003) (see MPEP §706.02(f)(1)(I)). This is so because while Udagawa has an international filing date on or after November 29, 2000, it apparently did not designate the United States or publish under PCT Article 21(2) in English. The accompanying Rule 131 Declaration makes clear that the Applicants' claimed invention was conceived and reduced to practice at least prior to August 29, 2003. Thus, the Rule 131 Declaration effectively swears behind Udagawa.

Therefore, the accompanying Rule 131 Declaration removes both the Lin and Udagawa references (and any reference having a priority date of May 25, 2003 or later).

The present application for which claims 1-48 are directed includes three inventors: Emily F. Gallagher, Louis M. Kindt, and Carey W. Thiel. The accompanying Rule 131 Declaration includes signatures for Emily F. Gallagher and Louis M. Kindt. However, the signature for Carey W. Thiel is unavailable due to Mrs. Thiel's extended leave of absence from

employment of the Assignee and employer of all three inventors, International Business Machines Corporation. Several correspondences were sent to Mrs. Thiel as well as telephone calls. However, these correspondences/calls were unanswered. MPEP §715.04(I) allows for the submission and acceptance of an affidavit and declaration under 37 C.F.R. §1.131 when the signatures of the remaining joint inventors are provided. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections.

II. Entry of Amendment and Rule 131 Declaration Required

MPEP § 715.09 provides that a Rule 131 Declaration is considered timely submitted if it is submitted prior to a final rejection. Therefore, the attached Rule 131 Declaration swearing behind the Lin and Udagawa references is seasonably presented.

III. Formal Matters and Conclusion

The Rule 131 Declaration that accompanies this Response swears behind the Lin and Udagawa references thereby overcoming the rejections to the claims. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections to the claims.

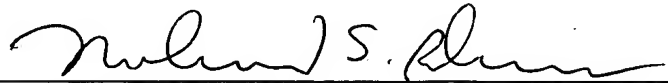
In view of the foregoing, Applicants submit that claims 1-48, all the claims presently pending in the application, are patentable with respect to the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to

discuss any other changes deemed necessary. Please charge any deficiencies and credit any overpayments to Attorney's Deposit Account Number 09-0456.

Respectfully submitted,

Dated: February 24, 2006



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